

**WHAT IS CLAIMED IS:**

1. An apparatus for removing residue in a fuel cell system having a plurality of flow fields for fuel gas and for oxidant, comprising:
  - an adsorbent tank storing adsorbent therein for adsorbing residue
  - 5 from the fuel cell system;
  - a vacuum pump connected to the adsorbent tank for separating the residue adsorbed by the adsorbent;
  - a pressure gauge for determining the pressure of the adsorbent tank;
  - first shut off valves mounted on input passages to the flow fields;
  - 10 second shut off valves mounted on output passages from the flow fields;
  - third shut off valves mounted on input passages to the adsorbent tank, which are diverged from the output passages between the flow fields and the second shut off valves; and
  - 15 a fourth shut off valve mounted on an output passage from the adsorbent tank to the vacuum pump.
2. An apparatus of claim 1, wherein the plurality of flow fields further includes a flow field for coolant.
- 20 3. An apparatus of claim 1, wherein a coolant drain pump is mounted on the output passage from the flow field for coolant.
4. An apparatus of claim 1, wherein the adsorbent is selected
- 25 from one of zeolite and silica gel.
5. An apparatus of claim 1, wherein the inner space of the adsorbent tank is divided into sections corresponding to the flow field for fuel gas and the flow field for oxidant.

6. An apparatus of claim 5, wherein the adsorbent in each section of the adsorbent tank is selected based on the kind of residue adsorbed in the section.

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7. An apparatus of claim 1, further comprising a heat exchanger interposed between a fuel cell stack and the adsorbent tank, transferring emitted heat from the fuel cell stack to the adsorbent tank.

10 8. An apparatus for removing residue from a fuel cell system, comprising:

a fuel cell stack;  
a fuel gas flow field;  
a oxidant flow field; and

15 an adsorbent tank coupled to said fuel gas flow field and oxidant flow field, and configured to adsorb residue from the fuel gas flow field and oxidant flow field.

9. The apparatus of claim 8, further comprising first shut off valves mounted on input passages to the fuel gas flow field and oxidant flow field.

10. The apparatus of claim 8, further comprising second shut off valves mounted on output passages from the fuel gas flow field and oxidant flow field.

11. The apparatus of claim 8, further comprising third shut off valves mounted on input passages from the fuel gas flow field and oxidant flow field to the adsorbent tank.

12. The apparatus of claim 8, further comprising a fourth shut off valve mounted on an output passage from the adsorbent tank to a vacuum pump.

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13. The apparatus of claim 8, further comprising a vacuum pump connected to the adsorbent tank for separating the residue adsorbed by adsorbent in the adsorbent tank.

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14. The apparatus of claim 8, further comprising a pressure gauge for determining the pressure of the adsorbent tank.

15. A method for removing residue in a fuel cell system having a plurality of flow fields for fuel gas and for oxidant, comprising:

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insulating input passages and output passages of the plurality of the flow fields when the fuel cell system stops operating;

communicating the plurality of flow fields with an adsorbent tank for adsorbing the residue in the fuel cell system; and

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separating the residue adsorbed by the adsorbent by operating a vacuum pump connected to the adsorbent tank.

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16. A method of claim 15, further comprising, before the separation of the residue, determining if the pressure of the adsorbent tank reaches a steady state; insulating the adsorbent tank when the pressure of the adsorbent tank reaches the steady state; transferring the heat emitted from the fuel cell system to the adsorbent tank; and determining whether the pressure of the adsorbent tank is larger than a predetermined pressure, wherein the vacuum pump is driven when the pressure of the adsorbent tank is larger than the predetermined pressure.

17. A method of claim 16, wherein the plurality of flow fields further includes a flow field for coolant; and the method for removing residue further comprises, before the insulating of the input passages and the output passages of the plurality of the flow fields, draining residual coolant  
5 by driving a coolant drain pump mounted on the output passage from the field for coolant.

18. A method for removing residue in a fuel cell system having  
10 a fuel gas flow field and an oxidant flow field, comprising:  
closing input passages and output passages of the plurality of the flow fields when the fuel cell system stops operating; and  
opening the plurality of flow fields to an adsorbent tank configured to adsorb residue of a fuel cell system.

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19. The method of claim 18, further comprising removing the residue from the adsorbent tank.

20. A method of claim 19, further comprising, before removing  
20 the residue, determining if the pressure of the adsorbent tank reaches a steady state; insulating the adsorbent tank when the pressure of the adsorbent tank reaches the steady state; transferring the heat emitted from the fuel cell system to the adsorbent tank; and determining whether the pressure of the adsorbent tank is larger than a predetermined pressure, wherein the vacuum  
25 pump is operated when the pressure of the adsorbent tank is larger than the predetermined pressure.